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A History of Rat Control In Alberta

Norway rats are one of the most destructive creatures known to man. They destroy and contaminate untold quantities of food, and through their tunneling activities, undermine the foundations of buildings, sewer and water lines, and city streets. Rats also weaken and deface buildings by gnawing holes through floors, walls, insulation and supporting structures. Norway rats carried the flea that spread plague throughout Europe and Asia. Even today, they spread organisms responsible for food poisoning, hepatitis, tularemea and other diseases.

Thus, the people of Alberta are extremely fortunate not to have rats. This is not by chance but by design. For the past four decades, Alberta has had a program to keep rats out of the province. This publication describes the evolution, history and current status of the rat control program in Alberta, and discusses factors which contributed to its success.

Norway rats are unique because they must live with people or their structures. They cannot survive in natural areas and cannot overwinter in cultivated fields in Canada. Norway rats are not native to North America but were introduced to the east coast about 1775 and gradually spread westward over most of the continent. Norway rats spread westward as North America became settled, as farms became closer together and as cultivated land began to dominate the landscape.

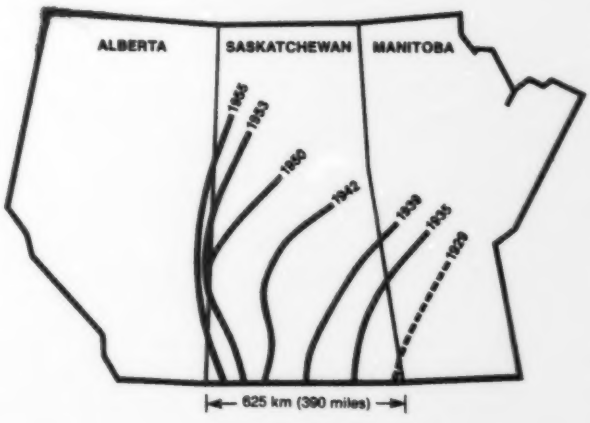

Figure 1. The westward movement of the Norway rat across the prairies.

Rats entered eastern Saskatchewan in the 1920s and extended their range to the northwest at about 24 km (15 mi) per year (fig. 1). Rats were first reported on the eastern border of Alberta in 1950, and would have continued to spread westward had it not been for a rat control program that halted their advance and continues to maintain an essentially rat-free province to date.

The Early Years, 1950-53

Norway rats were first discovered on a farm near Alsask on the eastern border of Alberta during the summer of 1950. The discovery was made by field crews from Alberta Department of Health, engaged in studies of sylvatic plague, a disease of Richardson's ground squirrel. Although they were aware of the economic destruction caused by rats, provincial authorities were initially concerned that rats might spread plague throughout Alberta. Consequently, the Alberta government decided to halt or at least slow the spread of rats to the west. In 1950, responsibility for rat control was transferred from Alberta Department of Health to the Department of Agriculture.

Alberta Agriculture was probably the better choice to administer a rat control program because the affected area was predominantly rural. The department specialized in extension and was better staffed and organized in rural areas. Existing legislation also authorized the control of agricultural pests.

The Agricultural Pests Act of Alberta, 1942, authorized the Minister of Agriculture to designate as a pest any animal that was likely to destroy crops or livestock. The act further stipulated that every person and every municipality had to destroy and prevent the establishment of designated pests. Where pest control was not considered adequate, the provincial government could carry out the necessary measures and charge the costs to the landowner or municipality. Therefore, legislation that mandated control of pests by every person and every level of government was in place before rats ever entered Alberta, and became effective when rats were declared a pest in 1950. An amendment to the act in 1950 further required that every municipality appoint a pest control inspector.

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William Lobay, supervisor, crop protection, originally conceived the idea of a control zone to prevent rats from spreading into Alberta, and was initially responsible for organizing, supervising and administering the program during 1950 to 1953.

Most people in Alberta had had no contact with rats and did not know what rats looked like or how to control them. Consequently, the government's initial response was to educate the public and obtain support from local governments and residents.

Preserved rat specimens were distributed to Alberta Agriculture offices to aid in the identification of rats in the 1950s. In 1951, five provincial employees whose primary responsibility was weed inspection, provided training and assistance to municipal pest control inspectors. Personnel from Saskatchewan Department of Health, familiar with rats and rat control, also assisted with training. Conferences on rat control were held in six towns in eastern Alberta and 2,000 posters and 1,500 mimeographed pamphlets, **Rat Control In Alberta, 1951,** were distributed to elevators, railway stations, schools, post offices and private citizens.

Rat Control In Alberta, 1951 advocated destruction of rats, elimination of rat harborages and food supplies, and rat-proofing of buildings — principles which are still valid and basic for rat control today. Recommended toxicants were red squill, antu, barium carbonate, zinc phosphide, 1080, thallium sulfate, arsenic, strychnine alkaloid and warfarin. Warfarin, the first anticoagulant rodent poison, was still a new and relatively untried toxicant in 1951.

By fall 1951, 30 rat infestations had been confirmed along 180 km of Alberta's eastern border, and in 1952, rats were active along 270 km of border. Most infestations were within 10 to 20 km of the border although rats had penetrated 50 to 60 km westward in three areas between Medicine Hat and Provost.

Alberta did not have the expertise to control rats and probably could not have developed the expertise in time to halt the movement of rats to the west. Consequently, a private pest control firm was contracted to control rats until Alberta Agriculture could develop an effective program.

During June 1952 to July 1953, 63,600 kg of 73 per cent arsenic trioxide tracking powder was used to treat 8,000 buildings on 2,700 farms (24 kg/farm; 8 kg/building) in an area 20 to 50 km wide and 300 km long between Medicine Hat and Provost. Tracking powder was blown underneath all permanent buildings within the control zone. While only permanent buildings were supposed to have been treated, some temporary structures were treated as well. Tracking powder was exposed in some areas where the treatment was haphazard or where temporary buildings were moved or torn down. In addition, some residents were not informed that arsenic was being used, and some, allegedly, were told that the tracking powder was only harmful to rodents. Consequently, some nontarget poisoning of livestock, poultry and pets occurred for at least the first two to four years after treatment. As a precaution, Alberta Agriculture sent letters to all residents in the control zone each year until 1955, warning of the dangers to humans, livestock and pets.

The poison-proofing program was expensive, costing $152,670 for 1952-53, of which 74 per cent was for tracking powder. Annual cost of rat control did not exceed this figure until 1978. Consequently, the poison-proofing program was discontinued because the cost was considered too high and the arsenic poison too dangerous. However, the program apparently was effective; most infestations were confined to areas within 10 to 20 km of the border, and Alberta Agriculture was given the time to develop a rat control program.

The Government Program, 1953-59

During 1953 to 1959, the rat control program evolved into its current structure. Pest control inspectors were appointed by municipalities and control was administered and supervised by local governments with co-ordination and support by the provincial government. The southward spread of rats was halted in 1953 when they reached the relatively uninhabited Cypress Hills. Rats continued to spread north until 1958 when they were stopped by the uninhabited and unbroken boreal forest near Cold Lake.

Then, as today, the seven rural municipalities bordering Saskatchewan carried the major responsibility for rat control. Funding, however, was in dispute; these municipalities argued that they were spending funds to protect the entire province from rats. Thus, in 1954, Alberta Agriculture agreed to pay 50 per cent of the salary and expenses of a full-time pest control inspector for each rural municipality along the eastern border. These pest control inspectors checked every premise within the first three ranges (29 km) west of the border (fig. 2), distributed bait and established bait stations, encouraged rat-proofing of buildings and the removal of rat harborage and food, and destroyed any rat infestations that were found.

Rat bait was supplied free of charge to all municipalities that had appointed a pest control inspector. Warfarin, the first anticoagulant rodent poison, was available in 1953. Warfarin was

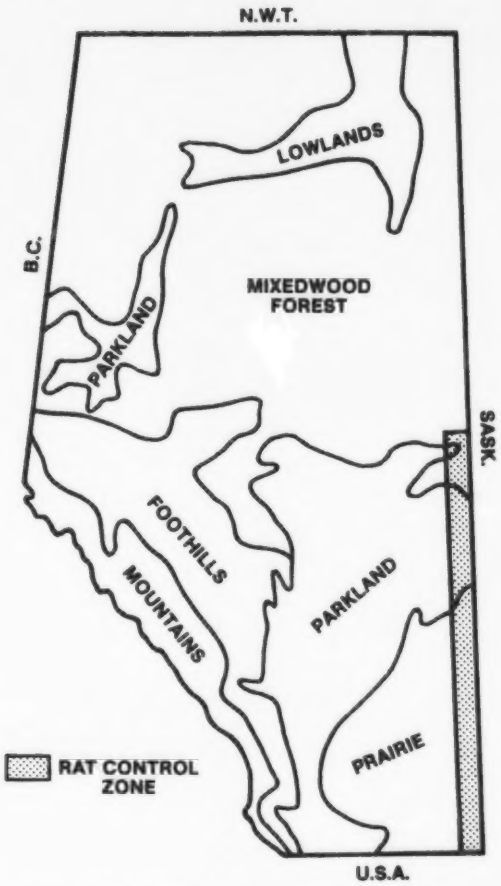

Figure 2. Rat control zone in eastern Alberta.

developed in Wisconsin, where finely-ground corn was the recommended bait substrate. However, corn was not normally available to rats in Alberta and bait acceptance was poor. A series of field trials during 1953 to 1955 showed that coarsely-rolled oats gave satisfactory results; this bait substrate is still used today. The amount of bait used in the control program increased annually until about 1958 and then leveled off with the yearly requirements varying between 5,000 and 13,000 kg of dry warfarin bait and between 660 and 4,750 litres of water-soluble warfarin.

Public education and information continued. Posters and brochures on rat control were widely distributed, displays were presented at local fairs, picnics and rodeos, and talks were presented to schools, 4-H clubs, agricultural societies, Chambers of Commerce, and to just about anyone who would listen. "Call of the Land," an Alberta Agriculture agricultural news program began broadcasting in 1953 and was used to disseminate information on rat control. Public interest and support for rat control was favorable, particularly from people who had rats. As an example, seven meetings were attended by almost 900 people in the Medicine Hat area during February 1956. However, there was some resistance. One mayor refused to co-operate because he thought the program was a red herring initiated by the ruling political party. Another mayor refused to believe that rats would threaten his town and stated that he would eat any rats within the town limits. He subsequently changed his mind when presented with a bushel of rats from a local abatoir.

Indian reservations and Metis colonies in north-central Alberta presented a special problem in public relations. Natives did not want to have rats but were only familiar with strychnine, and assumed that all poisons had the same properties. Warfarin baits were removed or destroyed by Natives because they feared for their children, pets and livestock. David Stelfox with Alberta Agriculture held a series of meetings with Natives and casually chewed on warfarin-treated rolled oats while discussing rat control and the physiological effects of warfarin. His behavior had a startling effect on the Natives, for they expected him to die before their eyes, and convinced them of the relative safety of warfarin.

The Agricultural Pests Act made rat control mandatory. Property holders who failed to control rats and disregarded repeated encouragement and warnings from pest control inspectors could be served with an official warning. Failure to comply with the terms of the warning could result in a court action. However, legal recourse was not used for several years until the public was educated in rat control. The first court case did not occur until 1955. In 1956, 17 notices to control were issued and three court actions and convictions resulted. At that time, court cases were heard by a local magistrate who was usually a locally prominent citizen, often a merchant or postmaster. Therefore, rat control was enforced as well as supervised at the local level. The court actions apparently had the desired effect, for no more than seven notices to control rats have been issued in any year since 1956.

The City of Lloydminster presented a special problem in rat control because it straddles the Alberta-Saskatchewan border. Obviously, rat control in Lloydminster, Alberta, would have been difficult if there were no control in the Saskatchewan portion of the city. This dilemma was resolved by orders in council by the governments of Alberta and Saskatchewan that declared that the Agricultural Pests Act of Alberta applied to Lloydminister, Saskatchewan.

The number of known rat infestations in the border area increased rapidly from one in 1950 to 573 in 1955, and varied between 394 and 637 during 1956 to 1959. After 1959, numbers of infestations dropped

dramatically (fig. 3). Hence, almost 10 years passed before an accumulation of training, experience and public education brought the rat problem firmly in hand.

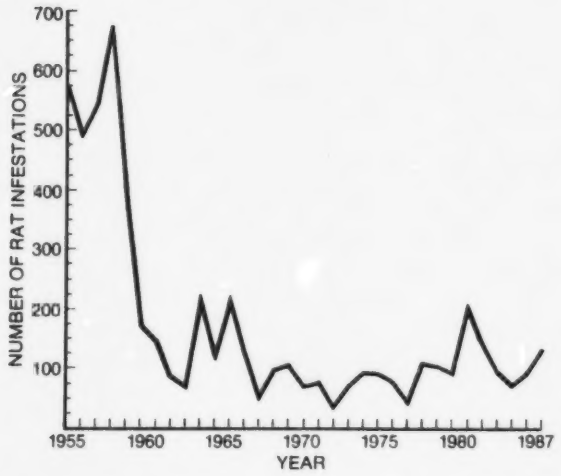

Figure 3. Number of known infestation in the rat control zone.

1960-Present

Rat control in Alberta has not changed markedly since 1960. The bulk of control is conducted by pest control inspectors hired and supervised by rural municipalities along the Alberta-Saskatchewan border. The provincial government's share of funding was increased to 60 per cent in the 1971, 75 per cent in 1973, and 100 per cent in 1975. All premises within the 29x600 km control zone from Montana to Cold Lake are inspected at least annually (fig. 2). Numbers of premises inspected annually vary between 2,000 and 4,000. Rat infestations are eliminated by bait, gas or traps. Buildings are occasionally moved or torn down, and in some cases, rats are dug out with a backhoe or bulldozer. Farmers within the control zone are encouraged to eliminate rat food sources and harborages, and to maintain permanent bait stations. Rats within bale stacks of hay and straw are a continual problem; farmers are encouraged to place bait within the lower one or two layers of bales when the stacks are built. Pits are dug for municipal garbage disposal sites so that garbage can be buried or burned, and sites are fenced to channel garbage into the pits.

Saskatchewan initiated a rat control program in 1963 which may have reduced the number of rats moving into Alberta. Over the years, meetings have been held with personnel from Saskatchewan to share information and discuss common problems. Some municipal employees from Alberta also work on rat control in Saskatchewan to reduce migration into Alberta.

Newer anticoagulants have been used, but warfarin is the standard poison. Warfarin on coarsely-rolled oats with 5 per cent icing sugar is distributed in 454-gram plastic bags. Colored confetti was added to the rolled oats as a safety precaution in 1965. Warfarin water baits are also effective, particularly in the semi-arid prairie and on premises (e.g., grain elevators) where food is plentiful.

After 1959, the number of infestations dropped dramatically; numbers vary between 36 and 216 per year (fig. 3).

Surprisingly, overland transportation of rats has not been a major problem, with no more than eight infestations reported in any one year. Most infestations within the interior of Alberta consist of a single rat transported by truck or rail.

A few white rats have been brought in by pet stores, biology teachers, and well-meaning individuals who did not know that it was unlawful to have rats in Alberta. The white rat or laboratory rat is a domesticated Norway rat. If white rats escaped captivity or were turned loose, they could multiply and spread throughout Alberta just like the wild Norway rat. Consequently, white rats can only be kept by zoos, universities and colleges, and recognized research institutions in Alberta. Private citizens may not keep white rats, hooded rats or any of the strains of domesticated Norway rats.

Perhaps the greatest "problem" is that most residents of Alberta still cannot identify rats and rat signs. Hundreds of suspected infestations are reported each year by concerned citizens, but most turn out to be muskrats, pocket gophers, ground squirrels, bushy-tailed wood rats or mice. However, all suspected infestations are investigated either by local or provincial field staff. As previously mentioned, confirmed infestations are eradicated as soon as possible.

After nearly 40 years, the public information and education effort might best be described as a maintenance program. Within the control zone, residents know how to identify and control rats. Periodic inspections serve as a reminder that the rat control program is active and necessary. Within the interior of Alberta, most residents know that Alberta is rat-free and there is a program to keep it that way. Most public education is directed toward identification of rats and rat signs. The discovery of a rat in Edmonton or Calgary receives full media coverage. In addition, the success of the program is reported by provincial or national media three or four times a year, and serves as a reminder to the

residents that rat control is still an important program in Alberta.

The cost of the rat control program rose dramatically in recent years, increasing from $58,000 in 1969 to about $250,000 per year at present. Regardless, rat control is probably still a bargain with annual per capita costs of less than $0.12 province-wide.

After many years, rat control has become routine and is a source of pride to the citizens of Alberta. However, the problem is not solved; personnel involved in rat control must continually guard against complacency. Rats have the capability to spread throughout Alberta just as easily today as they could 30 years ago.

Reasons for success

The rat control program in Alberta has been successful for several reasons. Some of the more prominent reasons are as follows:

Geography/distribution of people

The distribution of rats is dependent upon the distribution of people, which in turn is affected by geography. Alberta is protected from an overland invasion of rats by the sparsely-populated prairie on the south, mountains on the west and forest on the north.

Overland movement of rats is limited to a 520-kilometre-long area along the eastern border, between the sparsely populated Cypress Hills in the south and boreal forest in the north (fig. 2). The area is predominantly rural. The largest city in the control zone is Lloydminster with a population of about 16,000. The rural character of the zone serves to hinder the spread of rats, at least during the winter, and isolate infestations which makes eradication easier.

Climate

Winter in Alberta is characterized by several months of continuous snow cover and below-freezing temperatures. Overwinter infestations are limited to man-made structures; severe climate prevents colonies from overwintering in open fields where they would probably go undetected.

Size of the infested area

The bulk of the control effort is limited to a relatively small area (520x29 = 15,080 km^2). Control would be more difficult if the area were larger.

New problem

The rat control program was initiated as soon as rats entered the province. The people never became accustomed to living with rats and never became complacent.

Legislation

Alberta had the legislation in place that authorized a rat control program and mandated control of pests before rats ever entered Alberta.

Grass roots program

Rat control was the responsibility of local governments and was supervised and enforced by local citizens. It was not a product of faceless bureaucrats. On the other hand, the bulk of the work was conducted by only seven rural municipalities. Co-ordination of the program would have been more difficult if a large number of municipalities were involved.

Availability of anticoagulants

Alberta was fortunate because warfarin, which is relatively safe for humans and effective against rats, was developed and available soon after rats entered the province. Public opposition could have prevented continuation of the rat control program if control were limited to the relatively hazardous poisons available in the 1950s.

Personnel

The rat control program in Alberta has been successful because of the concern and effort of thousands of citizens and hundreds of pest control inspectors. However, most human accomplishments result from the right person being in the right place at the right time. The Alberta rat control program was no exception. Three men contributed immeasurably to the success of the program: William Lobay, supervisor of crop protection, had the imagination to conceive the program in 1950, and directed the program from 1950-53; Arthur M. Wilson continued to support the program as field crops commissioner and later as director, plant industry division; and Joseph B. Gurba, the first full-time permanent employee on the rat control program, developed, co-ordinated, and supervised the program from 1953 to 1982.

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